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Deliver to: Daborah Chacko Davis, USPTO

Art Group: _____1756_____

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Date: August 6, 2008

From: Brent E. Vecchia, Reg. No. 48,011

Our Docket No.: 42P17301

Number of pages 15 including this sheet.

Application No.: 10/687,288

Filing Date: 10/15/2003

Docket Due Date(s): 8/11/2008

Enclosed are the following documents:

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| <input type="checkbox"/> Appeal Brief (pgs) | <input type="checkbox"/> Notice of Appeal (in duplicate) |
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TRANSMITTAL FORM (to be used for all correspondence after initial filing)		Application No.	10/687,288
		Filing Date	October 15, 2003
		First Named Inventor	Wang Yuch
		Art Unit	1756
		Examiner Name	Daborah Chacko Davis
Total Number of Pages in This Submission		15	Attorney Docket Number
			42P17301

ENCLOSURES (check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> PTO/SB/08 <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Response to Missing Parts/Incomplete Application <input type="checkbox"/> Basic Filing Fee <input type="checkbox"/> Declaration/POA <input type="checkbox"/> Response to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input checked="" type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input checked="" type="checkbox"/> Other Enclosure(s) (please identify below): <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> -Facsimile Coversheet </div>
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Firm or Individual name	Brent E. Vecchia, Reg. No. 48,011 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	<i>Brent E. Vecchia</i>
Date	August 6, 2008

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FEE TRANSMITTAL for FY 2007 <small>Patent fees are subject to annual revision</small>		<i>Complete if Known</i>	
		Application Number	10/687,288
<input type="checkbox"/> Applicant claims small entity status See 37 CFR 1.27. TOTAL AMOUNT OF PAYMENT (\$)		Filing Date	October 15, 2003
		First Named Inventor	Wang Yueh
		Examiner Name	Daborah Chacko Davis
		Art Unit	1756
		Attorney Docket No.	42P1730T

METHOD OF PAYMENT (check all that apply)	
<input type="checkbox"/> Check <input type="checkbox"/> Credit card <input type="checkbox"/> Money Order <input checked="" type="checkbox"/> None <input type="checkbox"/> Other (please identify): _____	
<input checked="" type="checkbox"/> Deposit Account Deposit Account Number: <u>02-2666</u> Deposit Account Name: <u>Blakely, Sokoloff, Taylor & Zafman LLP</u>	
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FEE CALCULATION					
Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1251	120	2251	60	Extension for reply within first month	
1252	460	2252	230	Extension for reply within second month	
1253	1,050	2253	525	Extension for reply within third month	
1254	1,640	2254	820	Extension for reply within fourth month	
1255	2,230	2255	1,115	Extension for reply within fifth month	
1401	510	2401	255	Notice of Appeal	
1402	510	2402	255	Filing a brief in support of an appeal	
1403	1,030	2403	515	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1460	130	2460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
1809	810	1809	405	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	810	2810	405	For each additional invention to be examined (37 CFR § 1.129(b))	
Other fee (specify)					
SUBTOTAL (2)				(\$)	

SUBMITTED BY		Complete (if applicable)	
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Signature	<i>Brent E. Vecchia</i>	Telephone	(408) 720-8300
		Date	08/06/08

Based on PTO/SB/17 (12-04) as modified by Blakely, Sokoloff, Taylor & Zafman (wtr) 12/15/2004
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FEE TRANSMITTAL for FY 2007 <i>Patent fees are subject to annual revision.</i>		<i>Complete if Known</i>	
		Application Number	10/687,288
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.		Filing Date	October 15, 2003
		First Named Inventor	Wang Yueh
TOTAL AMOUNT OF PAYMENT (\$)		Examiner Name	Daborah Chacko Davis
		Art Unit	1756
		Attorney Docket No.	42P17301

METHOD OF PAYMENT (check all that apply)	
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<input checked="" type="checkbox"/> Deposit Account Deposit Account Number: <u>02-2666</u> Deposit Account Name: <u>Blakely, Sokoloff, Taylor & Zafman LLP</u>	
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FEE CALCULATION					
Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
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1810	810	2810	405	For each additional invention to be examined (37 CFR § 1.129(b))	
Other fee (specify)					
SUBTOTAL (2)				(\$)	

SUBMITTED BY		Complete (if applicable)	
Name (Print/Type)	Brent E. Vecchia	Registration No. (Attorney/Agent)	48,011
Signature	<i>Brent E. Vecchia</i>	Telephone	(408) 720-8300
		Date	08/06/08

Based on PTO/SB/17 (12-04) as modified by Blakely, Sokoloff, Taylor & Zafman (wir) 12/15/2004
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application No. : 10/687,288
1st Named Inventor : Wang Yueh
Filed : 10/15/2003
Docket No. : 42P17301

Confirmation No. : 7538
Art Unit : 1756
Examiner : Daborah Chacko Davis
Customer No. : 8791

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO EXAMINER'S ANSWER
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Sir:

This is a Response to the Examiner's Answer mailed in the above-captioned case on 6/11/2008. The fees required and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying Transmittal. Appellants respectfully request consideration of this appeal by the Board of Patent Appeals and Interferences for allowance of the above-captioned patent application.

An oral hearing is not desired.

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I. ARGUMENT (37 C.F.R. § 41.37(c)(1)(vii))

A. REJECTION OF CLAIM 27 UNDER 35 U.S.C. § 112, FIRST PARAGRAPH, AS ALLEGEDLY FAILING TO COMPLY WITH THE WRITTEN DESCRIPTION REQUIREMENT IS BELIEVED TO BE IMPROPER.

GROUP I: CLAIM 27

Claim 27 recites “*wherein the non-chemically amplified photoresist layer does not include a photo-acid generator (PAG)*”. The Examiner has asserted that “*there is no disclosure in the specification teaching that the non-chemically amplified generator does not include a photo acid generator (PAG)*”. See e.g., page 2 of the Final Office Action mailed 9/27/06.

Appellants respectfully disagree. Paragraph [0005] discloses that “*For chemically amplified photoresists, the mechanism is different. Instead of PAC, Photoacid generator (PAG) is used (emphasis added). ... The disadvantage of this approach is that during the post-exposure bake process, the acid produced by the exposure of the photoacid generator (PAG) will diffuse into the film. The diffusion is non-uniform and produces a situation where the polymer lacks sufficient randomness to deblock, which exacerbates the LWR problem (emphasis added) for all wavelengths.*” Paragraph [0029] discloses that “*Embodiments of the invention provide a non-chemically amplified photoresist (i.e., does not include PAG) (emphasis added), which results in reduced LWR*”.

In the Appeal Brief, Applicants mistakenly attributed the quote above for paragraph [0029] to paragraph [0031].

In addition, the Examiner has asserted that a photoactive compound is a photoacid generator. Applicants respectfully disagree. Photoactive compounds (PACs) used for non-chemically amplified photoresists are understood by those skilled in the art to be different compounds than photoacid generators (PAGs) used for chemically amplified resists. The patent application

appropriately uses these different terms to refer to these different compounds. Accordingly, those skilled in the art and having the benefit of the present disclosure would understand that these terms refer to different compounds. The Examiner has not provided any evidence that a compound known as a photoactive compound (PAC) for a non-chemically amplified photoresist is also known as a photoacid generator (PAG) for a chemically amplified resist.

Accordingly, Appellants respectfully submit that there is sufficient written description for claim 27, and respectfully request that the rejection of claim 27 be overturned.

B. REJECTION OF CLAIMS 21-25 AND 30-34 UNDER 35 U.S.C. § 103(A) AS ALLEGEDLY BEING UNPATENTABLE OVER U.S. PATENT NO. 5,759,739 TO TAKEMURA ET AL. (HEREINAFTER TAKEMURA) IN VIEW OF U.S. PATENT APPLICATION PUBLICATION NO. 2005/0074699 BY SUN ET AL. (HEREINAFTER SUN) IS BELIEVED TO BE IMPROPER

GROUP II: CLAIMS 21-25 AND 30-34

The Examiner has rejected claims 21-25 and 30-34 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,759,739 to Takemura et al. (hereinafter Takemura) in view of U.S. Patent Application Publication No. 2005/0074699 by Sun et al. (hereinafter Sun). Appellants respectfully submit that claims 21-25 and 30-34 are allowable over Takemura and Sun.

Claim 21 recites a method comprising:

“depositing a layer on a substrate;

depositing a non-chemically amplified photoresist layer upon the layer, the non-chemically amplified photoresist layer having a developer-soluble resin and a photoactive compound, the photoactive compound inhibiting solubility of the developer-soluble resin;

exposing selected portions of the non-chemically amplified photoresist layer to an extreme ultra-violet light source such that solubility of the selected portions of the non-chemically amplified photoresist layer is promoted; and
developing the exposed portions of the non-chemically amplified photoresist layer”.

Accordingly, claim 21 pertains to a method of using a **non-chemically amplified photoresist layer** that includes a **developer-soluble resin** and a **photoactive compound** that inhibits the solubility of the developer-soluble resin. Furthermore, the method includes exposing selected portions of the non-chemically amplified photoresist layer to an **extreme ultra-violet light source**.

(1) Firstly, on page 3 of the Final Office Action mailed 6/28/07, the Examiner has admitted that “Takemura does not disclose that the photoresist layer is non-chemically amplified”. The Examiner again admitted this on pages 12-13 of the Examiner’s answer. However, claim 21 specifically recites “a non-chemically amplified photoresist layer”. Non-chemically amplified photoresist mechanisms are well known in the arts and are known to be different than chemically amplified photoresist mechanisms like those discussed in Takemura.

The Examiner has used Takemura to reject the claimed developer-soluble resin and the claimed photoactive compound. Applicants respectfully submit that Takemura does not disclose the claimed developer soluble resin or the claimed photoactive compound that inhibits the solubility of the developer-soluble resin. Paragraph [0005] of the present patent application discloses that “For chemically amplified photoresists, the mechanism is different. Instead of PAC, Photoacid generator (PAG) is used. The resin (PHOST) in the photoresists are not soluble (emphasis added) in developer.” Accordingly, in chemically amplified systems the resin is typically **not considered to be developer soluble** until after exposure because of the protective groups. Takemura discusses chemically amplified resists. In the Examiner’s Answer, the Examiner has not indicated precisely where she believes Takemura discloses that the resists are developer soluble. Claim 21 makes it clear that the deposited layer has a **developer-soluble**

resin. Additionally, Takemura discusses photoactive generators (PAGs) but doesn't disclose photoactive compounds (PACs). As understood by Applicants, PAGs are understood in the art to be different than PACs. Still further, claim 21 recites "*the photoactive compound inhibiting solubility of the developer-soluble resin*". In the Examiner's Answer, the Examiner has not indicated precisely where she believes Takemura discloses that the photoactive generators discussed in Takemura inhibit solubility of the developer-soluble resin. The section referred to by the Examiner refers to a "dissolution inhibitor", but this does not appear to be the separately mentioned "photoacid generator". Accordingly, the Examiner's assertion on the top of page 13 of the Examiner's Answer that "Takemura teaches a resist layer has the same components as that of the resist layer recited in claim 21" is clearly not true.

Accordingly, some of the chemical components in Takemura may at first glance seem similar to the claimed components, but they are **different**. The differences between these components is due, at least in part, to the fact that Takemura does not disclose non-chemically amplified photoresists.

Furthermore, the Examiner has admitted on page 13 of the Examiner's Answer that "*Sun is not depended upon to disclose the claimed composition of a non-chemically amplified layer*". Accordingly, Applicants respectfully submit that the Examiner has not properly established where the claimed non-chemically amplified layer is disclosed in the cited references.

The Examiner has asserted that "*Sun, in [0039], discloses that the chemically amplified photoresist layer can be replaced with a non-chemically amplified photoresist layer*". See e.g., the bottom of page 3 of the Final Office Action mailed 6/28/07.

Paragraph [0039] of Sun recites:

[0039] The thin photoresist provides a number of important advantages to the photolithographic process. First, there are no outstanding photoresist patterns in the entire process. Dry etch masking is no longer required for the photoresist, making the photoresist more of a photosensitive layer rather than a photoresist. Second, the photoresist layer is so thin that transparency becomes less of a problem. Third, due to the extraordinarily thin photoresist, this invention opens an opportunity to replace the ever troubling chemically amplified photoresist with non-chemically amplified photoresists for the photolithography process of KrF or shorter wavelengths. Fourth, chances for the protective layer and photoresist patterns to collapse are significantly reduced, if not completely eliminated, due to the low aspect ratios and the excellent adhesion of the protective layers to substrates. Fifth, the thinness of the photoresist will inevitably improve the pattern resolution. Sixth, the exposure focus offset has less impact on a thin photoresist than on a thick one. Critical dimension (CD) variation of the protective layer patterns due to different DOF is less significant due to the thin photoresist.

The Examiner appears to have relied upon the statement in paragraph [0039] that *"this invention opens an opportunity to replace the ever troubling chemically amplified photoresist with non-chemically amplified photoresists for the photolithography process of KrF or shorter wave-lengths"*. However, the section of Sun relied upon does not disclose that a non-chemically amplified photoresist in general be useful for extreme ultra-violet (EUV) lithography, but only for *"KrF or shorter wave-lengths"*. KrF lithography uses a deep ultra-violet (DUV) wavelength of about 248 nm. Applicants respectfully submit that it is inappropriate to extrapolate the statement in Sun all the way down from 248nm KrF to EUV. This statement might possible encompass other DUV wavelengths (e.g., 193nm). However, Applicants respectfully submit that this statement should not be construed to encompass the next-generation EUV lithography which uses a much smaller wavelength of about 13nm. Furthermore, materials suitable for DUV lithography commonly are not suitable for EUV lithography. Accordingly, the statement in Sun should not be construed to mean that non-chemically amplified photoresists in general are suitable for EUV.

Accordingly, neither Sun nor Takemura discloses or renders obvious a method of using a non-chemically amplified photoresist layer that includes a developer-soluble resin and a photoactive compound that inhibits the solubility of the developer-soluble resin and that includes exposing selected portions of the non-chemically amplified photoresist layer to an extreme ultra-violet light source.

(2) Secondly, Takemura should not be combined with Sun since Takemura pertains to chemically amplified photoresist layers and Sun pertains to non-chemically amplified photoresist layers. The Examiner has argued on page 14 of the Examiner's Answer that Sun teaches the interchangeability of chemically amplified resist with a non-chemically amplified resist. However, Applicants respectfully submit that this, without more, is insufficient to suggest that teachings (e.g., of the components and wavelengths) for chemically amplified resists be combined with teachings for non-chemically amplified resists.

Accordingly, for at least one or more of these reasons, claim 21 and its dependent claims are believed to be allowable over Takemura and Sun.

Independent claim 30 and its dependent claims are believed to be allowable for one or more similar reasons.

For at least these reasons, the claims of Group II (claims 21-25 and 30-34) are believed allowable over Takemura and Sun.

C. REJECTION OF CLAIMS 21, 26, 30 AND 35 UNDER 35 U.S.C. § 103(A) AS ALLEGEDLY BEING UNPATENTABLE OVER U.S. PATENT NO. 5,358,599 TO CATHEY ET AL. (HEREINAFTER CATHEY) IN VIEW OF U.S. PATENT APPLICATION PUBLICATION NO. 2005/0074699 BY SUN ET AL. (HEREINAFTER SUN) IS BELIEVED TO BE IMPROPER

GROUP III: CLAIMS 21, 26, 30 AND 35

Claim 21 recites a method comprising:

“depositing a layer on a substrate;

depositing a non-chemically amplified photoresist layer upon the layer, the non-chemically amplified photoresist layer having a developer-soluble resin and a photoactive compound, the photoactive compound inhibiting solubility of the developer-soluble resin;

exposing selected portions of the non-chemically amplified photoresist layer to an extreme ultra-violet light source such that solubility of the selected portions of the non-chemically amplified photoresist layer is promoted; and

developing the exposed portions of the non-chemically amplified photoresist layer”.

(1) Firstly, on page 4 of the Final Office Action mailed 6/28/07, the Examiner has admitted that “Cathey does not disclose that the photoresist layer is non-chemically amplified”. However, claim 21 specifically recites “a non-chemically amplified photoresist layer”.

The Examiner has used Cathey to reject the claimed photoactive compound that **inhibits the solubility of the developer-soluble resin**. Applicants respectfully submit that the Examiner has not precisely pointed out where she believes that Cathey discloses the claimed photoactive compound that **inhibits the solubility of the developer-soluble resin**. Applicants have carefully reviewed the section of Cathey cited by the Examiner in the Examiner’s Answer and find no disclosure of the claimed photoactive compound that **inhibits the solubility of the developer-soluble resin**. Additionally, Cathey discusses photoactive generators (PAGs) but doesn’t appear to disclose photoactive compounds (PACs). As understood by Applicants, PAGs are understood in the art to be different than PACs.

Accordingly, Cathey does not disclose either the claimed **non-chemically amplified resist**, or the claimed **photoactive compound that inhibits the solubility of the developer-soluble resin**.

However, the Examiner has asserted that “Sun, in [0039], discloses that the chemically amplified photoresist layer can be replaced with a non-chemically amplified photoresist layer”. See e.g., the top of page 5 of the Final Office Action mailed 6/28/07.

As discussed above, Appellants submit that paragraph [0039] of Sun does not disclose that a non-chemically amplified photoresist be suitable for **extreme ultra-violet (EUV)** lithography. EUV lithography is a next generation lithography using a much smaller wavelength than KrF lithography. Applicants respectfully submit that it is inappropriate to extrapolate the statement in Sun all the way down from KrF to EUV.

Accordingly, neither Sun nor Cathey discloses or renders obvious a method of using a **non-chemically amplified** photoresist layer that includes a developer-soluble resin and a photoactive compound that inhibits the solubility of the developer-soluble resin and that includes exposing selected portions of the non-chemically amplified photoresist layer to an **extreme ultra-violet** light source.

(2) Secondly, Cathey should not be combined with Sun since Cathey pertains to chemically amplified photoresist layers and Sun pertains to non-chemically amplified photoresist layers. The interchangeability mentioned in Sun is insufficient to suggest that teachings (c.g., of the components and wavelengths) for chemically amplified resists be combined with teachings for non-chemically amplified resists.

Accordingly, for at least one or more of these reasons, claim 21 and its dependent claims are believed to be allowable over Cathey and Sun.

Independent claim 30 and its dependent claims are believed to be allowable for one or more similar reasons.

For at least these reasons, the claims of Group III (claims 21, 26, 30 and 35) are believed allowable over Cathey and Sun.

D. REJECTION OF CLAIMS 27-29 ARE REJECTED UNDER 35 U.S.C. § 103(A) AS BEING UNPATENTABLE OVER U.S. PATENT NO. 5,358,599 TO CATHEY ET AL. (HEREINAFTER CATHEY) IN VIEW OF U.S. PATENT APPLICATION PUBLICATION NO. 2005/0074699 BY SUN ET AL.

(HEREINAFTER SUN) AS APPLIED TO CLAIMS 21, 26, 30, AND 35 ABOVE, AND FURTHER IN VIEW OF U.S. PATENT APPLICATION PUBLICATION NO. 2004/0204328 BY ZHANG ET AL. (HEREINAFTER ZHANG), AND U.S. PATENT NO. 6,261,738 TO ASAKURA ET AL. (HEREINAFTER ASAKURA) IS BELIEVED TO BE IMPROPER

GROUP IV: CLAIMS 27-29

Appellants respectfully submit that claims 27-29 depend from claim 21. As discussed above, claim 21 is believed to be allowable over Cathey and Sun. As understood by Appellants, Zhang and Asakura do not remedy what is missing from Cathey and Sun. In particular, Zhang and Asakura do not disclose or render obvious a method of using a **non-chemically amplified** photoresist layer that includes a developer-soluble resin and a photoactive compound that inhibits the solubility of the developer-soluble resin and that includes exposing selected portions of the non-chemically amplified photoresist layer to an **extreme ultra-violet** light source. Furthermore, the Examiner has not relied upon these references to disclose these limitations.

Accordingly, claims 27-29 are believed to be allowable over these cited references for at least this reason.

CONCLUSION

Based on the foregoing, Appellants request that the Board overturn the rejection of all pending claims and hold that all of the claims of the present application are allowable.

Appellants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17 for such an extension.

Please charge any shortages and credit any overpayment to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: August 6, 2008

By Brent E. Vecchia
Brent E. Vecchia, Reg. No. 48,011
Tel.: (303) 740-1980 (Mountain Time)

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